

What Is Claimed Is:

1. A particle counting method, comprising the steps of:

5 taking in as aerosol a process gas in a process apparatus for conducting a physical or chemical reaction in a vapor phase;

charging particles existing in the aerosol;

10 then mixing the aerosol with a non-charged sheath gas flow shaped like a laminar flow and applying an electrostatic field to the particles existing in the aerosol to thereby get the respective particles into traces depending on their particle sizes; and

detecting particles having specific traces and
15 measuring the number of particles to thereby calculate the particle size distribution of the particles floating in the process apparatus.

2. A particle counting method according to clam 1, further comprising the step of taking in atmosphere in a clean
20 zone, in which the process apparatus to be measured is disposed, as a non-charged sheath gas.

3. A particle counting method according to clam 1, in the step of detecting the charged particles, further

comprising the step of modulating an electrostatic field intensity applied to a classifying region at low frequency and amplifying the electric signal of detecting the charged particles tuned to the low frequency in a narrow band.

5 4. A particle counting method according to claim 1, further comprising the step of applying voltage to a conductive plate, which is disposed after the taken-in aerosol is subjected to a charging process and can apply voltage to the aerosol flow, to thereby electrostatically attract and
10 remove floating ions included in the aerosol.

 5. A particle counting method according to claim 1, wherein the step of mixing the aerosol with a non-charged sheath gas flow shaped like a laminar flow and applying an electrostatic field to the particles existing in
15 the aerosol to thereby get the respective particles into traces depending on their particle sizes is replaced with the step of applying the electrostatic field to the particles in the aerosol to thereby get the respective particles into traces, and

20 wherein the step of detecting particles having specific traces and measuring the number of particles to thereby calculate the particle size distribution of the particles floating in the process apparatus is replaced with

the step of calculating the number of particles having particle sizes close to a specific particle size to thereby perform a band-pass filtering.

6. A particle counting method according to claim 1,
5 wherein the step of detecting particles having specific traces and measuring the number of particles to thereby calculate the particle size distribution of the particles floating in the process apparatus is replaced with the step of measuring a spatial number density of particles having particle sizes
10 larger than a specific particle size on the basis of three or more specific particle sizes by the use of a band-pass filtering operation to thereby predict a particle size distribution in a range covering all particle sizes.